39

~~3.12~~ The Law of Cosines

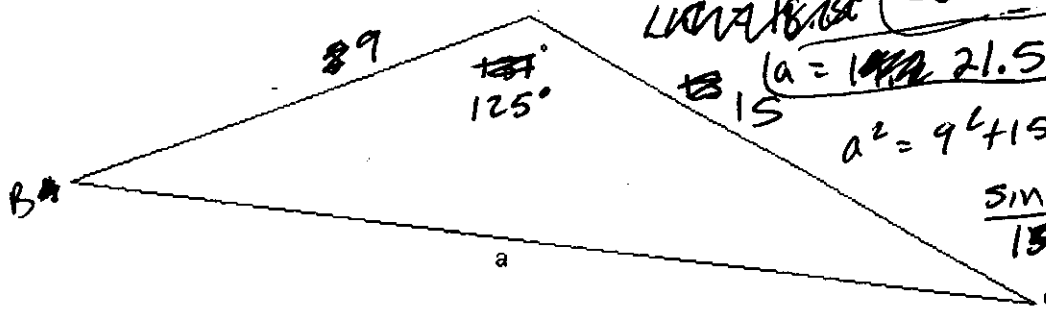
KEY (43 pts.)

Name _____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the triangle. Show work!

3 1)



$\angle B = 34.9°$
$\angle C = 20.1°$
$a = 21.5$

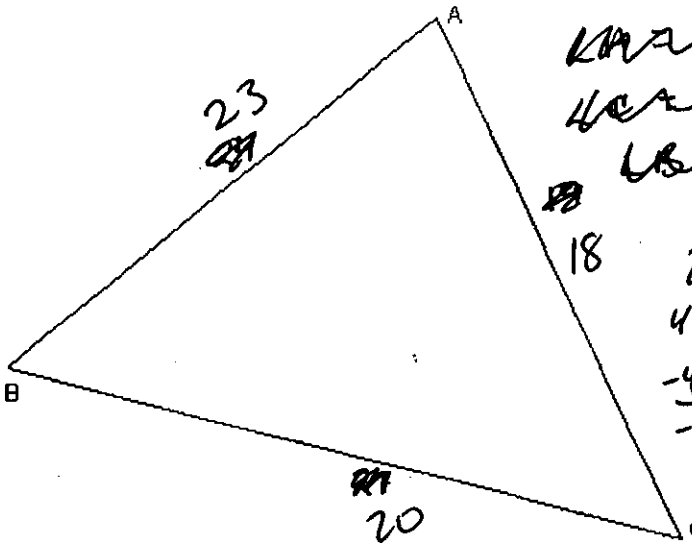
$a^2 = 9^2 + 15^2 - 2(9)(15)\cos 125°$

$\frac{\sin B}{15} = \frac{\sin 125}{21.5}$

$\angle B = 34.9°$

1) _____

3 2)



$20^2 = 23^2 + 18^2 - 2(23)(18)\cos A$

$400 = 853 - 828\cos A$

$\frac{-453}{-828} = \frac{-828\cos A}{-828}$

$\angle A = 56.8°$, $\angle B = 48.9°$, $\angle C = 74.3°$

$\frac{\sin 56.8}{20} = \frac{\sin B}{18}$

2) _____

3 3) A = 55°, b = 12, c = 7

$B \approx 89.3°$, $C \approx 35.7°$, $a \approx 9.8$

3) _____

3 4) a = 12, b = 21, C = 95°

$A \approx 28.5°$, $B = 56.5°$, $C \approx 25.1$

4) _____

1 5) a = 1, b = 5, c = 4

5) no triangles possible

3 6) a = 3.2, b = 7.6, c = 6.4

$A = 24.6°, B \approx 99.2°, C \approx 56.2°$

6) _____

6 7) A = 42°, a = 7, b = 10

$B_1 = 72.9°, C_1 = 65.1°, c_1 = 9.49$

$B_2 = 107.1°, C_2 = 30.9°, c_2 = 5.38$

7) _____

1 8) A = 63°, a = 8.6, b = 11.1

8) no triangle

Find the area of the triangle. Show work!

2 9) A = 47°
b = 32 ft
c = 19 ft

Area $\approx 222.33\ ft^2$

9) _____

2 10) B = 101°
a = 10 cm
c = 22 cm

Area $\approx 107.98\ cm^2$

10) _____

Decide whether a triangle can be formed with the given side lengths. If so, use Heron's formula to find the area of the triangle. Show work!

2 11) a = 4
b = 5
c = 8

Area ≈ 8.18

11) _____

1 12) a = 3
b = 5
c = 8

no triangle

12) _____

2 13) a = 19.3
b = 22.5
c = 31

Area = 216.15

13) _____

2 14) a = 33.4
b = 28.5
c = 22.3

$A \approx 314.05$

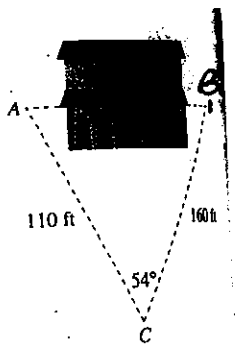
14) _____

Solve the problem.

15) Juan wants to find the distance between two points A and B on opposite sides of a building. He locates a point C that is 110 ft. from A and 160 ft. from B. If the angle at C is 54°, find the distance AB. 15) _____

2

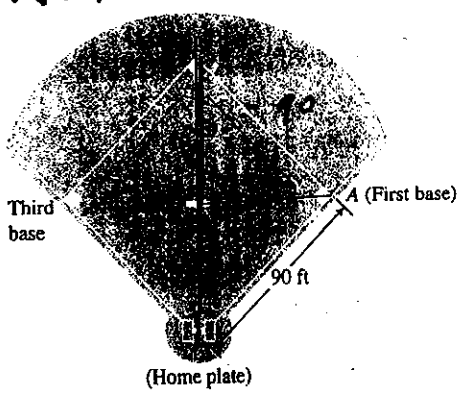
130.42 ft



16) **Designing a Baseball Field** 16) _____

3 a) Find the distance from the center of the front edge of the pitcher's mound to the far corner of the second base.. How does the distance compare withe the distance form the pitcher's mound to first base? (See figure)

66.8ft, a bit more than 63 ft



2 b) Find angle B in triangle ABC. ~~92.8°~~

$\angle ABC = 87.5°$

2 17) Tony must find the distance from A to B on opposite sides of a lake. He locates a point C that is 860 ft. from A and 175 ft. from B. He measures the angle at C to be 78°. Find the distance AB. 841.2 ft 17) _____